

separate forms above. The original chain-of-custody/analytical result forms will be included with the sample shipments. Copies will be maintained by the field sampling coordinator.

Certain samples, such as sediment cores, may require analyses that could be performed at several laboratories. For those samples, separate samples will be prepared from the core, one for each laboratory. The sample numbers, matrix and specific analyses to be performed by the receiving laboratory will be noted on the appropriate form. Since the analyses may require different sample containers or preservation techniques (Tables 4-1 and 4-2), a single sample will be collected and aliquots of the sample may be shipped in several containers. This information will be included on the chain-of-custody form.

5.1.2 Sample Receipt

The custodian will transfer information from the chain-of-custody/sample analysis form to a sample tracking system. The required analyses will be noted along with the number of containers for sample and preservation techniques.

5.2 SAMPLE HANDLING AND SHIPPING

Collected samples will be shipped to the laboratories for chemical testing. All samples will be preserved in accordance with requirements specified in Tables 4-1 and 4-2 while awaiting and during shipment. If the laboratory is not accessible by courier within 12 hours, shipment of samples will be via overnight carrier within 24 hours of collection of samples from the sediment core. If the laboratory is a local laboratory, the samples may also be either be picked up by the laboratory, or couriered to the laboratory.

5.2.1 Packaging

Containers will be packaged by analysis and sample matrix for shipment to the laboratories. All coolers containing samples for chemical analyses will be packaged with sufficient ice to maintain a temperature of 4EC from the time of collection to the time of receipt in the laboratory. Container lids will be affixed before shipment, and containers will be sealed with tape. Individual containers will be bagged in separate ziploc or twist tie bags to minimize potential cross contamination.

5.2.2 Shipping Procedures

Samples will be shipped in accordance with applicable regulations.

5.3 FIELD DOCUMENTATION

If field preservation of samples is necessary, the amount, type, and procedures will be documented in the field logbooks. Documentation of equipment used in field treating the samples, such as filtering equipment, will be maintained in the field logbooks. The brand name, pore size, and number of filters used will be recorded.

5.4 LABORATORY DOCUMENTATION

When the sample is received at the laboratory, the sample custodian and/or laboratory personnel will clearly document the processing steps that are applied to the sample. Sample preparation techniques and instrumental methods will be documented. Experimental conditions, such as the use of specific reagents, temperatures, reaction times, and instrument settings will be noted. The results of the analysis of all QC samples will be identified specific to each group of associated samples analyzed. The

laboratory logbook will include the time, date, and name of the person(s) who performed each processing step.

5.5 PROJECT FILES

Project documentation will be maintained in general accordance with guidelines in USEPA National Enforcement Investigation Center (NEIC) "Policies and Procedures", 1983, EPA 330/9-78-001-R. A project file will be maintained by the CPM which will contain appropriate project documentation. This file at a minimum will include these records:

- C Project plans and specifications
- C Field logbooks and data records
- C Photographs, maps, and drawings
- C Sample identification documents
- C Chain-of-Custody records
- C The entire analytical data package provided by the laboratory, including QC documentation
- C Data review notes
- C Report notes and calculations
- C Progress and technical reports
- C Correspondence and other pertinent information

FIGURE 5-1 Typical Chain of Custody Form

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FIGURE 5-2

TYPICAL SAMPLE ANALYTICAL REQUEST FORM

CLIENT: _____ # SAMPLES: _____
SDG # _____

<u>SAMPLE #</u>	<u>DESCRIPTION</u>	<u>ANALYZE FOR</u>	<u>SPECIAL</u> *
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

SPECIAL INSTRUCTIONS (Including Turnaround Time): _____

RELINQUISHED BY: _____
DATE/TIME: _____
RECEIVED BY: _____
DATE/TIME: _____
DELIVERABLES: Type _____ Required Date _____

* For MS/MSD or lab duplicate sample description.

6.0

CALIBRATION PROCEDURES AND FREQUENCY

This section pertains to the calibration of equipment and instrumentation to be used both in the field and in the laboratory during the project.

6.1 FIELD INSTRUMENTS AND MEASUREMENTS

All field equipment used during this project will be calibrated and operated as described in either the FSP and associated SOPs or in the operating manual for the field equipment.

6.2 LABORATORY INSTRUMENTS

The calibration procedures and frequency of calibration for laboratory equipment used for sample analysis will be consistent with the protocols specified in the analytical methods.

Procedures for calibration and maintenance of field instruments are included in the SOPs utilizing the field instrument. Use of the instrument is described in the appropriate SOPs as follows:

<u>Instrument</u>	<u>SOP No., Section</u>
pH Meter	SOP 10, Section 5.3
Salinity and/or Specific Conductance Meter	SOP 10, Section 5.3
Thermometer	SOP 10, Section 5.3
Flame Ionizing Detector	HASCP, Section 8.2

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<u>Instrument</u>	<u>SOP No., Section</u>
Suspended Sediment Sampler	SOP 11, Section 5.0
Bed Load Sampler	SOP 11, Section 5.0
Acoustic Doppler Current Profiler	SOP 10, Section 5.3
Fathometer	SOP 3, Section 5.5; SOP 4, Section 5.3; SOP 12, Section 5.3
Hydro I Unit	SOP 3, Section 5.5
Penetrometer	SOP 12, Section 5.3
GPS Unit	SOP 6, Section 5.3

7.0

ANALYTICAL PROCEDURES

This section of the QAPP describes the analytical methods that will be used for sample analysis for this project. In accordance with Section XI, Paragraph 71 of the AOC, the QA/QC limits are based on those set forth in "Test Methods for Evaluating Solid Wastes, SW-846" (SW-846). These limits specified in Section 3.0 of this QAPP are method specific for the volatile organics, semivolatile organics, polynuclear aromatic hydrocarbons, pesticide/PCBs, chlorinated herbicides and metals analyses. The analytical methods specified herein for these analyses are, therefore, those in SW-846. The limits for the PCDD/PCDF analysis are discussed below. As there are no equivalent SW-846 methods for the TEPH, TDS, and TSS analyses, the limits will be as specified below. The stated methods herein will be followed by personnel experienced and trained in the use and application of the methods. If, because of matrix effects or other unforeseeable circumstances the stated methods are unable to provide satisfactory results, other analytical methods may be utilized to successfully complete the analysis. Analytical methodology changes that are anticipated and those changes necessitated during analysis activities will be approved by EPA before utilization.

All proposed laboratories, their proposed assignments, qualifications, key personnel, etc. shall be identified in the SMP or amendments/notifications to the SMP as described therein. All laboratories used for this project will submit a laboratory Quality Assurance Plan.

7.1 ANALYTICAL METHODS

The extraction and analytical methods to be used are specified in Table 7-1. Copies of these methods are included as Appendixes A through K to this QAPP as a convenience

to the user. The methods must be performed as stated in the referenced methods. It is the laboratories responsibility to ensure that the analyses are performed by the referenced method and any changes by anyone to the copies in the appendices do not constitute changes to the analytical methods. All soils/sediment analytical results will be reported on a dry weight basis. All laboratories to be utilized for analysis of samples under this Remedial Investigation Work Plan shall strictly follow these procedures. This submittal of analytical methods shall be considered to satisfy the requirement stated in Section XI, Paragraph 71 of the AOC that any laboratory used "shall submit all protocols to be used for analysis to EPA at least thirty (30) days before beginning analysis." For each analytical method, the target analytes and quantitation or detection limit requirements are listed in Section 3.1 of this QAPP. The accompanying data validation procedures are provided in Section 8.0.

7.1.1 Volatile Organics

Volatile organics include compounds from various classes such as halogenated organics, non-halogenated organics, and aromatic organics. Volatile organics will be analyzed by Method 8260, Revision 0, July 1992 as specified in Table 7-1. A copy of the analytical method is included in Appendix A of this QAPP. The specific target compound list (TCL), SQL requirements, and QA/QC measures are listed in Section 3.0. The method employs gas chromatographic (GC) analysis using mass spectroscopy (MS) for detection and provides for positive detection at relatively low detection limits.

7.1.2 Semivolatile Organics

Semivolatile organics include phenols, nitrosamines, polynuclear aromatic hydrocarbons (PAHs), phthalate esters, and nitrotoluenes. Semivolatile organics will be extracted by Method 3520A, Revision 1, July 1992, and analyzed by Method 8270A, Revision 1, July 1992 as specified in Table 7-1. The method employs GC/MS for determining the

extractable base/neutral and acid compounds in sample extracts. A copy of the analytical method and the extraction methods for this and other semivolatile analytes (i.e., pesticide/PCBs) are included in Appendix B of this QAPP. The specific TCL, SQL requirements, and QA/QC measures are specified in Section 3.0.

7.1.3 Polynuclear Aromatic Hydrocarbons (PAHs)

PAHs will be analyzed for by GC/MS as part of the semivolatile organic analysis. The specific target analytes and SQL requirements for PAHs are listed in Section 3.0 and include those PAHs included in the TCL for semivolatile organics.

7.1.4 Organochlorine Pesticides and PCBs

The extraction/analysis method for organochlorine pesticides and multi-component PCBs will be Method 3520A, Revision 1, July 1992/8081, Revision 0, November 1992 as specified in Table 7-1. The analysis method (Method 8081) employs GC utilizing an electron capture detector. A copy of the analytical method appears in Appendix C of this QAPP. The extraction methods are included in Appendix B of this QAPP. The TCL, SQL requirements and QA/QC measures are listed in Section 3.0. All detected pesticides/PCBs will undergo confirmatory analysis on a chemically dissimilar second column. In addition to a matrix spike for pesticide compounds, a separate matrix spike for PCBs will also be performed by spiking with Aroclor 1254.

7.1.5 Chlorinated Herbicides

The extraction and analysis method for chlorinated herbicides will be Method 8150A, Revision 1, July 1992 as specified in Table 7-1 employs GC utilizing an electron capture detector. A copy of the analytical method appears in Appendix D of this QAPP. The